

International Oil & Ice Workshop

Anchorage October 2007

Environmental Strategies While Moving into a New and Challenging Oil and Gas Province – The Barents/Pechora/Kara Sea Areas

Bjørn Kristoffersen

The Area of Interest



- Multi-ethnic periphery region
- Natural resource-based economies
- Potential tensions between stakeholders
- Vast areas under Russian and Norwegian sovereignty
- Harsh climate and physical conditions
- Pristine and vulnerable ecosystems

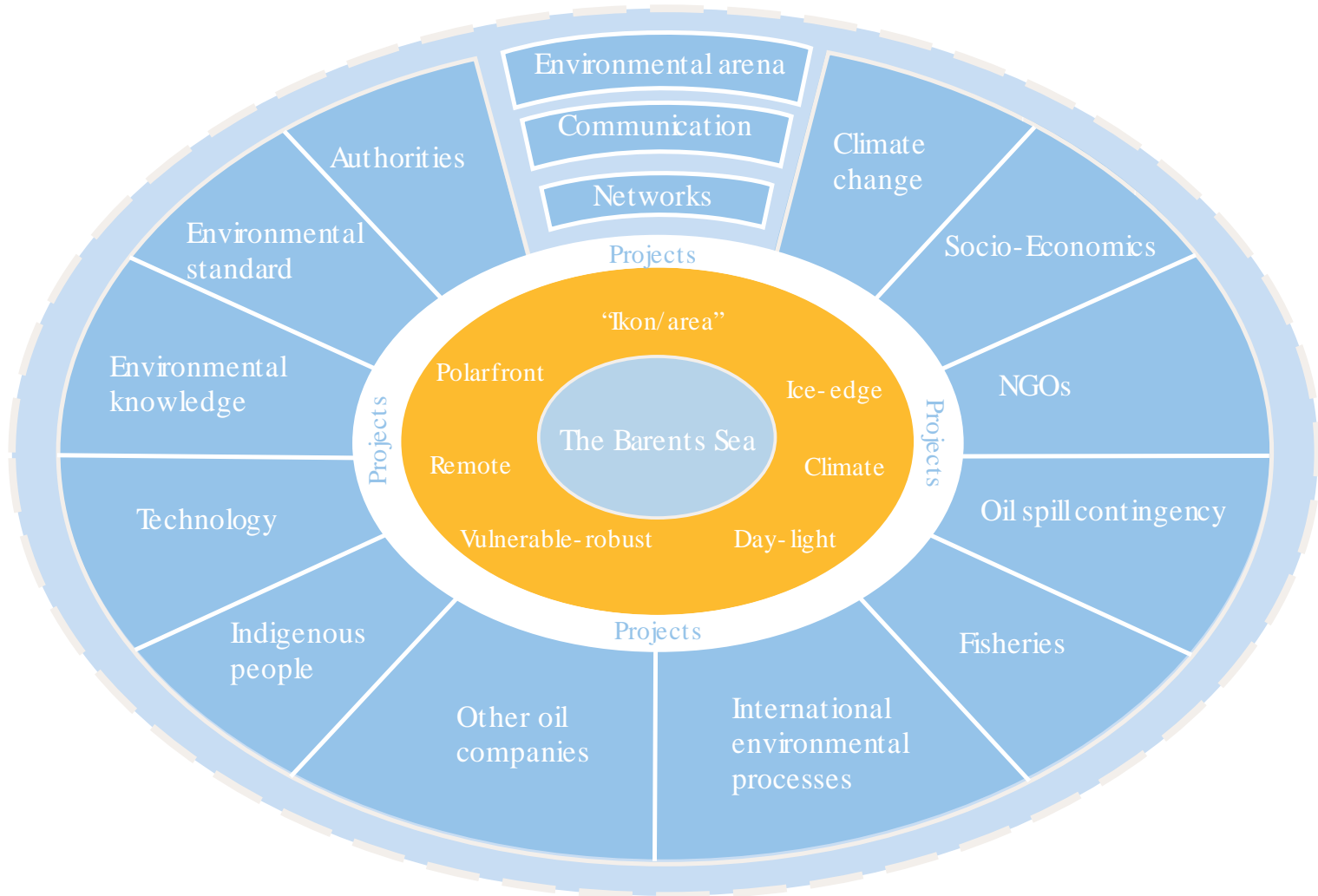
The Opportunities



- Increasing focus on hydrocarbon developments
- Snøhvit and Shtokman
- Remoteness and lack of infrastructure
- Unresolved boundary area
- Integrated Management Plan in Norway

The "co-existence circle of the ARCTIC"

A model for sustainable development



Focus Areas



1. Scenario 2030
ESIA challenges



2. Knowledge of
ecosystems



3. HSE standards &
environmental
technology



4. Emergency
response & oil
spill
contingency

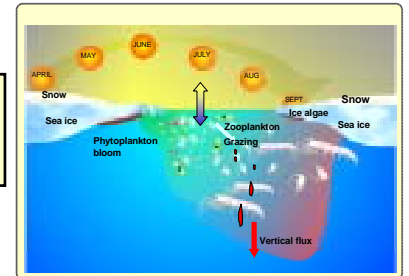
5. Stakeholder
engagement &
CSR



6. Regional
cooperation &
knowledge



7. Profiling &
alliances



8. Projects: Shtokman and other

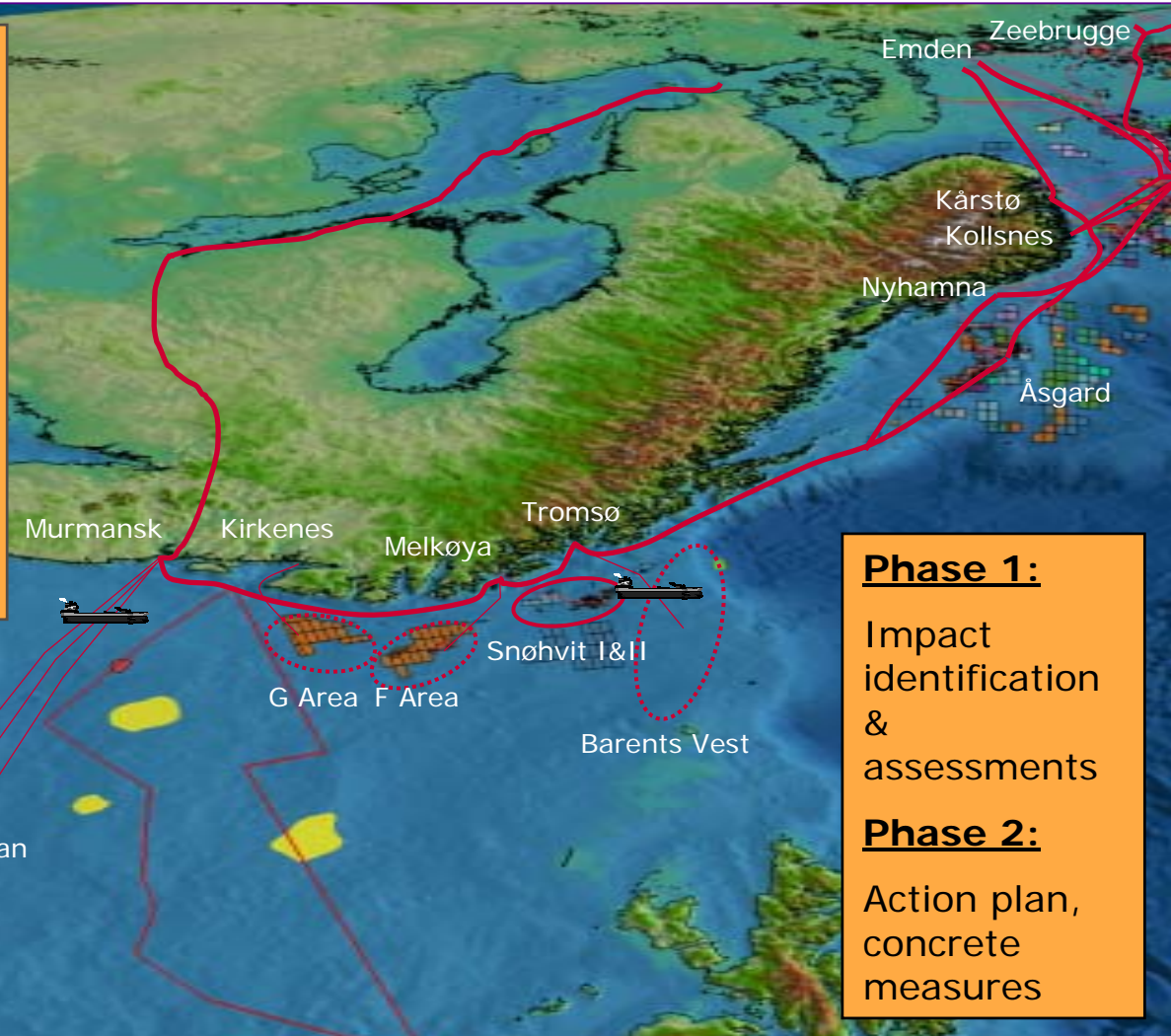
1. Scenario 2030 – Environmental and Social Challenges

Society

- Fisheries
- Indigenous peoples
- Transportation
- Communities
- Stakeholders
- Benefits

Environment

- Climate
- Discharge to sea
- Acute discharges
- Land use
- Habitat fragmentation
- Waste



Phase 1:

Impact identification & assessments

Phase 2:

Action plan, concrete measures

Socio-economics 2030

- Scenarios: "*Ways of rehearsing the future*"

The Frontier

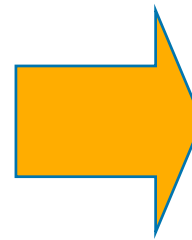
- rapid economic growth
- dense social and cultural networks
- successful natural resource based development

The Marginalized Region

- extensive activity but few regional effects
- no dynamic region, the region is lagging behind
- remote region tapped for all kinds of resources

The Shifting Balance

- high degree of oil/gas activities but regional effects only in Russia
- Norway a "nature Museum" with focus on tourism
- high focus on protecting Sami interests



1. No one-to-one relationship between extensive oil/gas development in the Barents Sea and the effects created in the adjacent region
2. Many actors do play an important role. Production of regional effects can hardly be left to the regional actors alone
3. Developments in the High North are influenced by a large range of factors, only marginally linked to oil/gas activities as such

Climate Change 2030

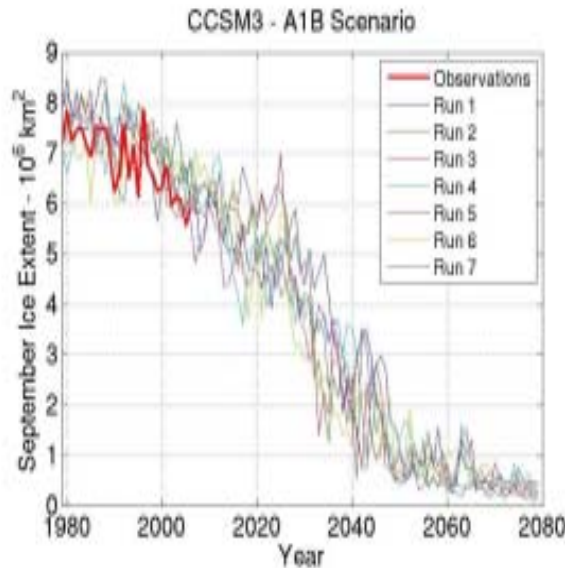
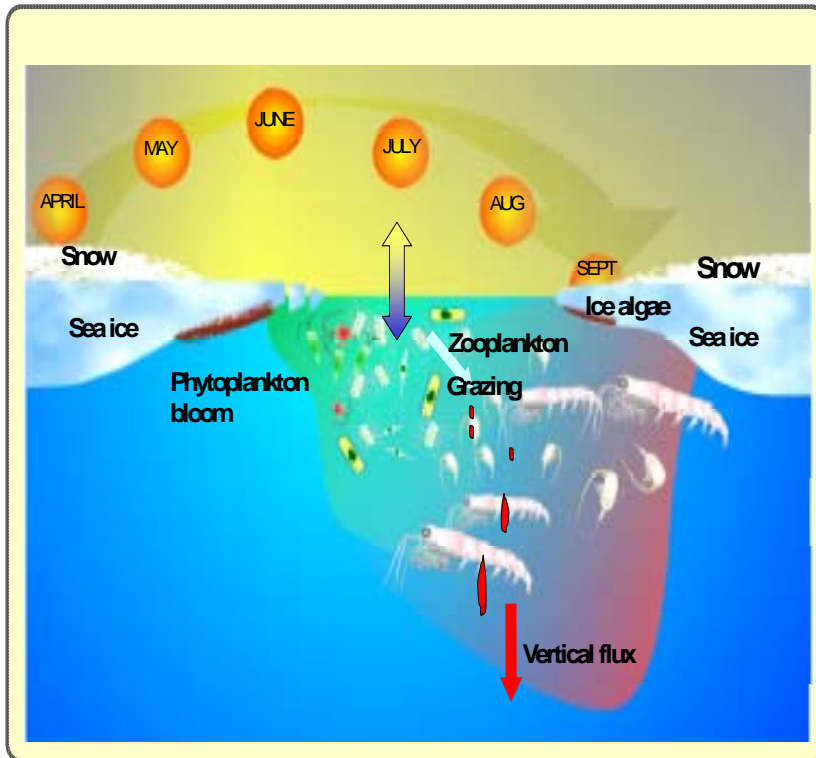


Figure 5. Scenarios for sea ice extent Northern hemisphere, September²¹

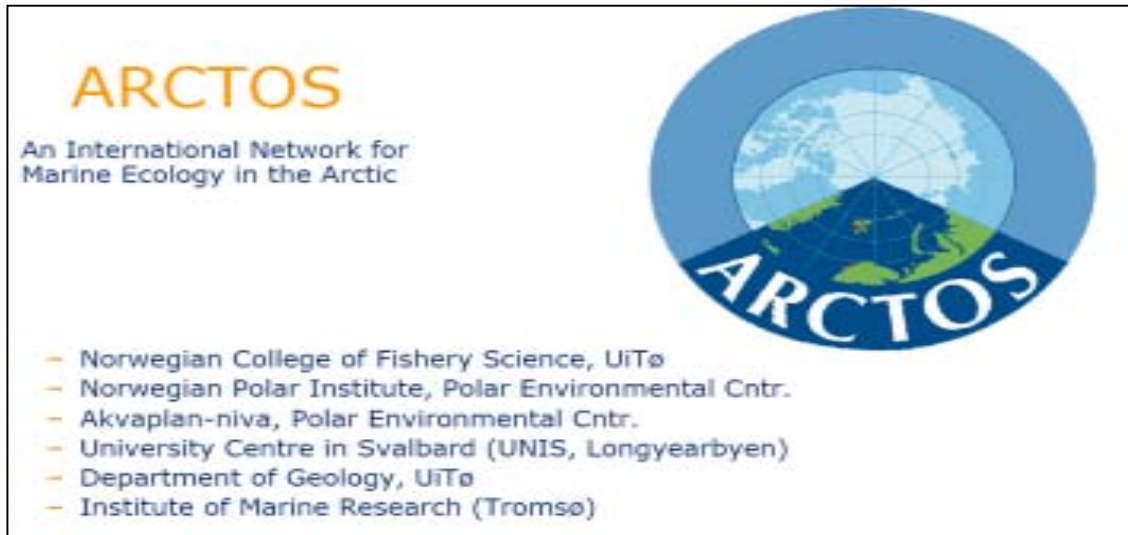
- The rising sea and earth temperature makes the snow and ice melt and ocean level rise
- This will increase the broader environmental awareness in the High North
- The petroleum industry, fisheries and tourism will have more opportunities by better access and competition between sectors will increase
- But there will be seasonal variations in climate and a volatile situation
- Engineering will still need to be based on extremes, operations might be easier
- The changes by 2030 will not radically alter the operating conditions, but the following 30 years will probably lead to a reinforced tendency
- Long term planning will be more challenging

2. Knowledge of the Ecosystems



- **Environmental research**
 - ARCTOS
 - Satellite tagging of seabirds
- **Research basis**
 - Ny-Aalesund Research Park
 - Ecotox laboratory for the Arctic
 - Ice Test Basin
- **Russia-Norway cooperation**
 - PINRO, MMBI

StatoilHydro – ARCTOS cooperation



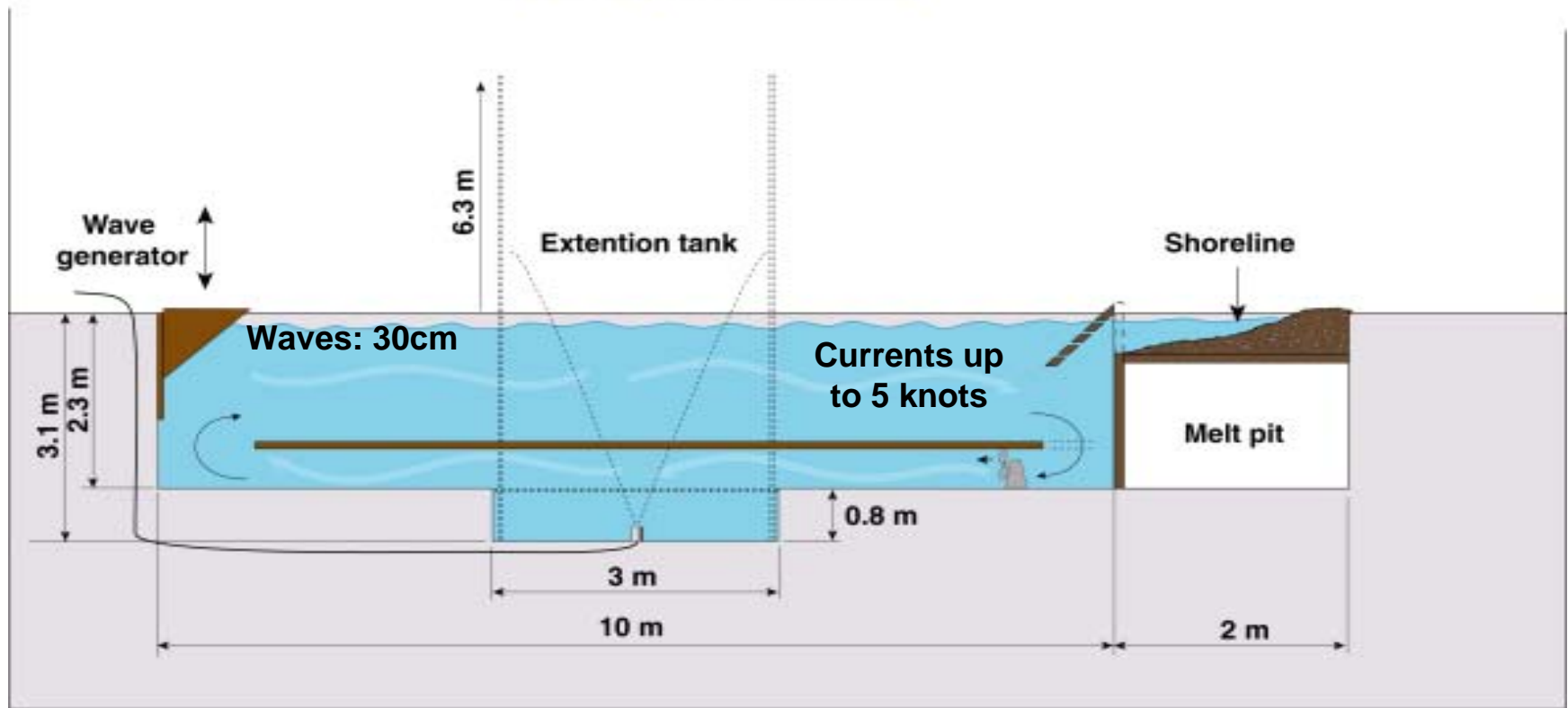
Unite 1: Combined ecological and ecotoxicological studies of ice edge ecosystems

Unite 2: Climate and anthropogenic studies on food webs connected to benthos in the Barents Sea

SINTEF Meso-scale test facilities.

Oil / Ice Basin established in a temperature controlled facility (-20 to + 20 °C)

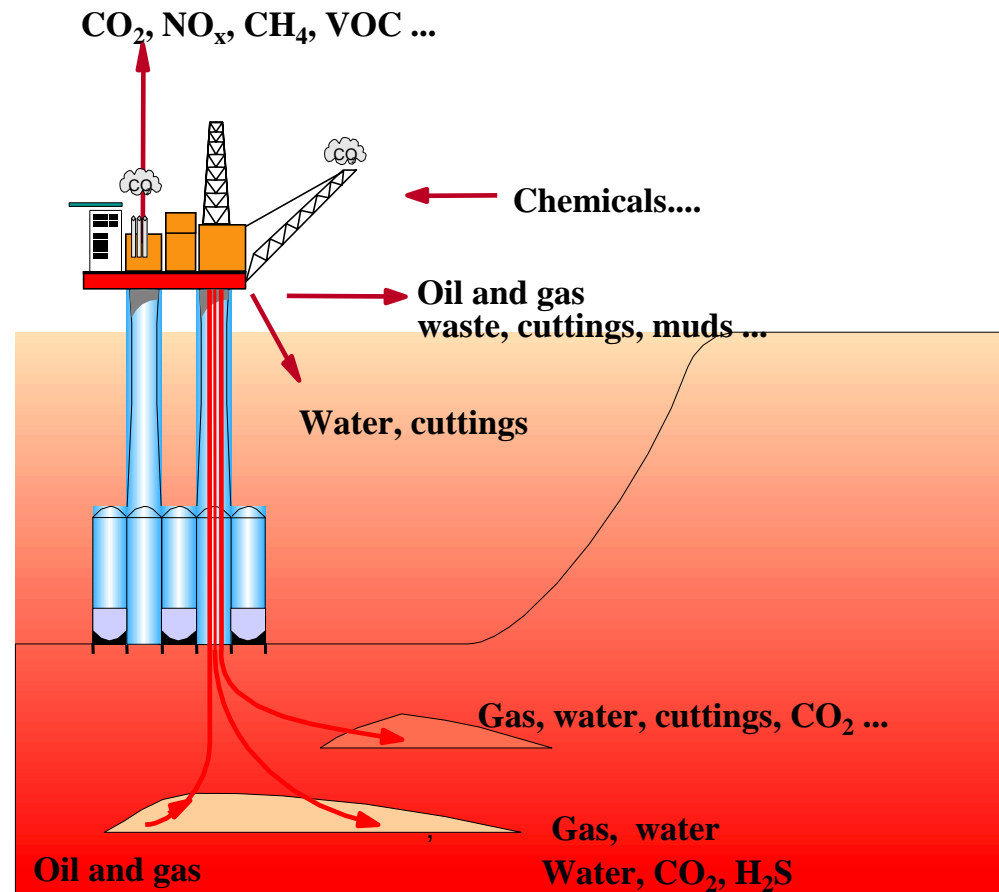
Test basin in the Oil Spill Test Laboratory
High degree of flexibility



3. Environmental Standards & Technology:

Zero Discharge to the Barents Sea

- Systems/technology for remote environmental monitoring from subsea structures
- CO₂ handling technology for the arctic areas
- Handling of produced water
- Waste management
- Restoration of tundra

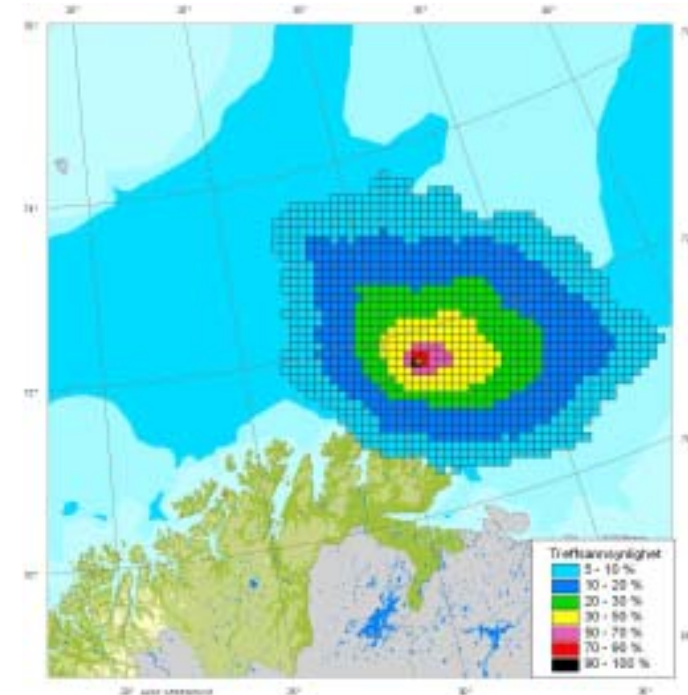
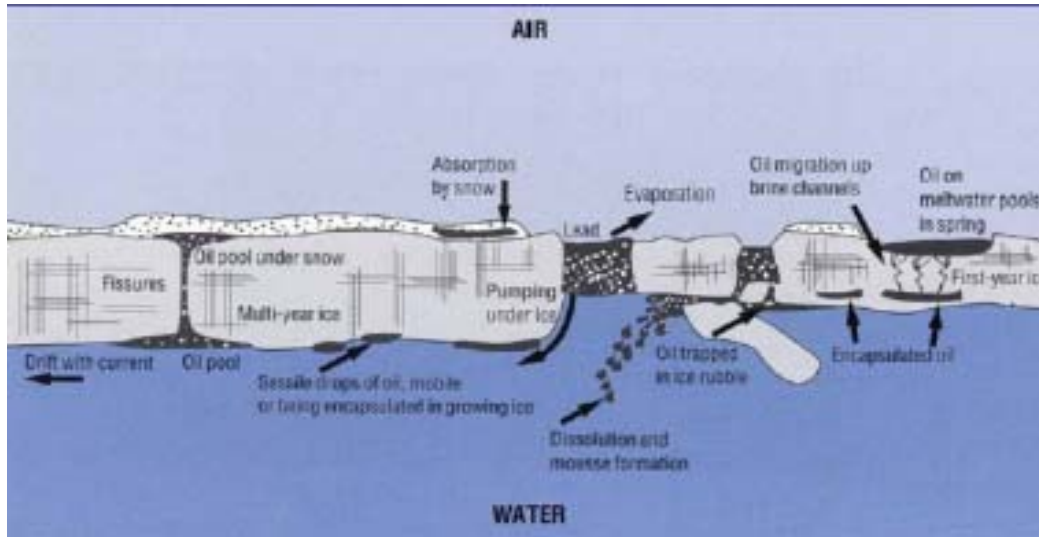


Snøhvit LNG - Subsea Installations

In deeper Arctic waters and where there are reservoirs with large area extents, sub sea solutions are to be considered.



4. Contingency to Fight Acute Pollution



- Oil spill response in ice-covered areas
- Coastal and shoreline oil spill response
- Environmental risk assessment and management
- Operations in environmentally sensitive areas

Resent testing of new skimmer in arctic conditions March, 2007



5. Stakeholder Engagement: Focus on Indigenous Peoples & Fisheries



- **Knowledge & understanding:**
Policy and studies of Sami and Nenets people
- **Traditional knowledge**
- **Integration into project developments:**
Integrated Ecosystem Management (UNEP)
- **Sami University:** EIA studies
- **Fisheries interaction studies**

6. Regional Cooperation and Knowledge



Murmansk Oblast

- Laboratory for analysis of ageing properties (MCSM)
- Oil spill contingency program (MCSM, Hydromet, MBASU)
- NOFO equipment to MBASU

Arkhangelsk Oblast

- Research on oil spill in Onega Bay
- Experience transfer: fisheries – oil industry
- Coastal sensitivity studies
- Environmental monitoring

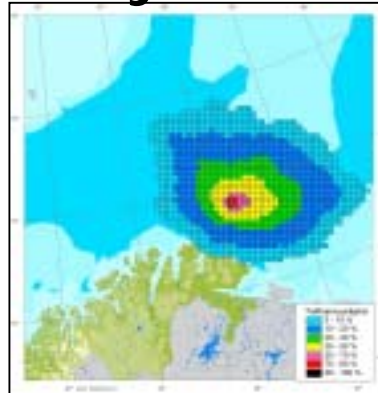
Murmansk Oblast Environmental Safety Program

MCSM lab



Oil sampling
& analysis

Hydromet



Oil weathering
Oil spill models

Data
storage

MBASU



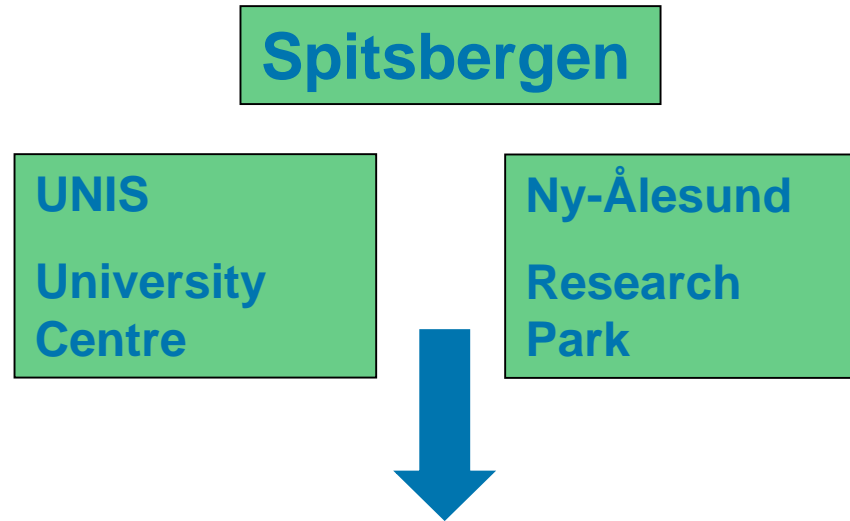
Oil spill
response

Norway

Russia

7. Profiling and Alliances

- Strategic alliances:
UNEP, UArctic
etc
- NGO relations
- Arctic Council
- Conferences
- Funding,
support



4th StatoilHydro Arctic Environment Conference
Spitsbergen 2008:
Society and Environment in the Arctic

Under the ice



Haakon Hop, Norsk Polarinstitutt